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European Study Groups with Industry in Portugal

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working groups

CHALLENGE 1

Multiplier effect of the Engineering & Tooling sector in Portugal

industry_ **Iberomoldes**
sector_ **Moulds**

Considering all kind of products which are of some use on our daily life, specially thermoplastic or metallic products obtained or manufactured by moulds or special tooling, this problem goal is to evaluate the impact, as well as the value of this specific industrial sector - Engineering & Tooling - in the national economy. Such impact should be measured in terms of perceptible value, instead of annual/mensal revenue.
Iberomoldes expects the perceptible value for the end user to be much larger than the annual/mensal revenue of the corresponding sector, but the following points are still unclear:

- How much larger is this perceptible value.
- What is the weight of the sector in the national economy and how representative is the sector of the full economy.

CHALLENGE 2

Innovation effect on the Engineering & Tooling sector

industry_ **Iberomoldes**
sector_ **Moulds**

The Engineering & Tooling sector may be said to be of the “single product” kind, i.e. each project is dedicated to one singular product with specific proprieties in terms of design, material, features, quantities, and market, among others. Therefore, each project needs a preliminary phase of research and development before entering the engineering and production phases.
Moreover, since this procedure is standard for this sector, then the research and development phase belongs to the core business of the companies, and thus the investment spent in this phase is not accounted as R&D investment, but as an operational cost.
This problem goals are to understand the following points:

- How can a traditional Engineering & Tooling company reflect this investment on its official accounts: Balance & Income statement.
- What is the most appropriate cost system for the companies in this sector.

CHALLENGE 3

Balanced Scorecard, objectives and its relationships

industry_ **Critical Software**
sector_ **IT and Software**

Critical Software has defined a Balanced Scorecard to help conduct, monitor and control its strategic management. A global objective for the company to achieve is defined, and depends on a given number of secondary objectives, which may depend on yet another level of underlying objectives to be fulfilled.
For each one of these objectives, there exists a threshold defining whether the goal has been achieved. Additionally, correlations between the several underlying objectives have already been identified.
However, the dependence between each objective has not yet been precisely determined or estimated. The current estimates rely on heuristic knowledge and daily working experience with the treatment of the current models.
The problem under consideration is to define a model which enables Critical Software to improve its knowledge in what concerns:

- the understanding of the dependence between each of the current underlying objectives, as well as the identification of previously unknown correlations between such objectives;
- the existence of hidden underlying objectives which may be relevant for the global objective, but are not being taken into consideration in the present model;
- the estimation of each underlying objective influence on every other objective.

CHALLENGE 4

Aircraft Components Maintenance Shop Production Planning: Random events prioritization

industry_ **TAP Maintenance and Engineering**
sector_ **Aeronautic**

Maintenance, Repair & Overhaul (MRO) companies are constantly being pressured by their costumers to improve turn-around-times, costs and increase on-time maintenance performance.
Each year, TAP M&E shops receive more than 25.000 components, from different aircraft systems (galley equipments, pneumatics, fuel, data recording, engines, and so on). About 20% of the activity is driven by planned removals, client schedules, AOG’s (aircraft on ground) and storage availability. The remaining, 80%, is driven by the shop manager experience and intuition!
The calculation of the component demand rate can be obtained by the removal rate (MTBUR - Mean Time Between Unscheduled Removals) and storage availability. The shop capacity depends greatly on the technician skills, test equipment, parts availability and repair time.
The component repair process is not standardized, and the time required to complete a repair is highly variable. It depends on what the fault is and most of the repair philosophy runs on a test-fix-test process. Every unit that comes to the shop is different, the type of failure is unpredictable, and the experienced technician and the upper-end test equipment are unique.
On the production scheduling level, the team leader must relate the individual tasks (clean, repair, overhaul, test) or set of tasks to the technician’s work list. This activity should assign the technicians and also the specific test equipments. Smart scheduling should keep the interdependencies into account, including sequence of tasks, availability of parts, resources and known delays. Tasks need to be dynamically reprioritized and re-allocated in response to changes in client schedules and resources availability.
Therefore, we face two main issues:

- How shall be defined the priority list (which units shall be tackled first)?
- How shall be distributed the prioritized components among technicians throughout all stations of the repair process?

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